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Investigation of a subsonic round binary jet release BORIS CHERNYAVSKY, PIERRE BÉNARD, Institut de Recherche sur l'hydrogène — We present results of an ongoing study of a binary H_2/CO jet/plume release. The original motivation behind this research lies in the need within the fuel cell community to establish safety criteria and the extent of potential danger envelope for unintended H_2/CO mixture releases for a variety of possible release conditions, including release velocity (jet versus plume type releases), orientation and release opening diameter, and initial gases fraction ratio, taking into account: a) the extent of flammable concentrations of H_2, corrected for the presence of CO; b) the extent of CO concentration exceeding health safety limits; c) the extent of flammable CO concentration. Presented are results of numerical simulations, covering a wide range of release conditions, including release velocity, orientation and gas fraction ratios. Particular attention has been paid to the gas segregation driven by a) buoyancy due to significant difference in gas densities; b) differences in diffusion properties, which could potentially affect jet evolution. It is shown that the observed segregation is small enough so that the concentration of one gas can be estimated from the measured concentration of another with sufficient degree of accuracy, except in the immediate vicinity of the origin of the jet. Subsequent simulations revealed that the primary driver of the segregation appears to be the difference in the diffusion properties between the mixture components.

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